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REMARKS

Claims 18, 20-38 and 62-73 are pending. Claims 18, 27 and 67 have been amended for clarity. Specifically, claims 18, 27 and 67 have been amended to clarify that the reactant stream comprises metal or metalloid precursors for the production of product particles. Applicant's specification supports the amendments, for example, at page 25, lines 8-23. No new matter is introduced by the amendments.

Applicant acknowledges with appreciation the allowance of claims 33-38 and 71-73 and the allowability of claims 29-32. Applicant respectfully requests reconsideration of the remaining rejections based on the above amendments and the following remarks.

Rejection Over Thaler in view of Whitney et al.

The Examiner rejected claims 18, 20, 22-28, 62, and 64 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,547,716 to Thaler (Thaler) in view of U.S. Patent 5,043,548 to Whitney et al. (Whitney). With all due respect, Applicant respectfully maintains that the claimed reaction configuration is distinct from the teachings of the combined disclosures of the cited references. To further clarify these distinctions, Applicant has amended the independent claims. In particular, the relevant reactant flow taught in Thaler does not comprise metal or metalloid precursors. Furthermore, Whitney teaches a particular configuration that is very distinct from the claimed configuration. Based on the clarifications to Applicant's claims, the combined teachings of the cited references clearly do not render the claimed invention *prima facie* obvious. Applicant respectfully requests reconsideration of the rejections based on the following comments.

Under a Graham analysis, the differences between the claimed subject matter and the teachings of the references must be examined. See *KSR Intern. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1729 (2007). With respect to Thaler, the reference teaches a reactant flow including a

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hydrocarbon and hydrogen gas. The reactant flow reacts in a reducing environment to form elemental carbon or diamond. See Thaler throughout. Thaler teaches the introduction of other elements through a sputter reaction. See, for example, column 4, lines 5-12, column 5, lines 23-37, column 6, lines 20-26 and column 10 through column 11, line 13. Thaler does not teach metal or metalloid precursors in a reactive flow that passes through a light beam with product particles in a product flow down stream from the light beam, as claimed by Applicant. Thaler generally teaches deposition on a substrate that is irradiated with the laser beam, although Thaler teaches embodiments with the spread in the plasma such that particles diffuse to remote substrates 34, 44 and 94 in Figs. 1, 4, 5 and 13. Thus, Thaler not only does not teach moving the substrate for coating, but Thaler also does not teach the reactive stream with metal/metalloid precursors prior to reaching a light beam with the flow "passing through the light beam" with particle produced in the reaction "downstream" from the light beam. Since Thaler does not teach a "flow" as claimed, there is no downstream direction through the light beam relative to a reactive flow with metal/metalloid precursors since the metal/metalloid elements are only generated from sputtering by the laser beam. This distinction points to a fundamental differences between Applicant's claimed processes and the Thaler processes.

With respect to Whitney, the laser plasma spray apparatus has a laser beam that is focused within a chamber just above the substrate, which necessarily aims the laser beam toward the substrate. See, column 3, line 10 to column 4, line 20. The configuration taught in Whitney is central to their deposition process since the nozzle is designed for the formation and direction of a plasma using energy from the laser beam. The Whitney configuration is similar to the majority embodiments of Thaler with the laser beam directed toward the deposition substrate. Whitney teaches moving the substrate being intersected by the laser beam. Whitney does not teach moving a substrate distinct from the path of the laser beam. The Whitney process becomes non-functional for its intended purpose if an alternative configuration is imposed on the system.

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Thus, the cited reference alone or combined do not teach or suggest a reactive flow with metal/metalloid precursors that flows through a light beam with resulting product particles downstream from the light beam. The Whitney reference teaches that the moving substrate should be intersected by the laser beam. Thus, there are very significant changes in the respective functions of elements between the claimed method and the methods of the cited references. The differences between the claimed subject matter and the teachings of the cited references are clearly not a simple matter of combining elements with predictable results since the elements are configured in fundamentally different ways in the claimed methods.

"A court must ask whether the improvement is more than the predictable use of prior-art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for improvement." *KSR Intern. Co.*, 127 S. Ct. at 1731. Under the present facts, none of the references teach or suggest the claimed reaction and coating configuration. Similarly, none of the references point to any problem at all that can be solved by the claimed coating configuration of the pending claims. The presently claimed coating method has the capability for forming very high quality coatings at high coating rates with a broad range of chemical compositions as described in published U.S. application 2005/0019504A to Bi et al., entitled "High Rate Deposition of High Quality Optical Coatings."

The claimed subject matter has fundamental differences with the teachings of the cited references. This distinction has been clarified with amendments to the claims. The present claims are clearly not rendered *prima facie* obvious by the combined teachings of the cited references. Applicants respectfully request withdrawal of the rejection of claims 18, 20, 22-28, 62, and 64 under 35 U.S.C. § 103(a) as being unpatentable over Thaler in view of Whitney. Applicant does not acquiesce in the Examiner's assertions regarding the dependent claims,

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although Applicant does not generally comment further on these issues since these issues are moot in view of the comments above. However, with all due respect, Applicant does note with respect to claim 22 that Thaler does not teach a reactant flow that is elongated in a plane **perpendicular** to the light beam, as disclosed and claimed by Applicant. Thaler only teaches a reactant flow elongated along the flow direction and not the cross section of the flow direction.

Rejection Over Thaler, Whitney et al. and Rao et al.

The Examiner rejected claims 21, 63 and 65-70 under 35 U.S.C. § 103(a) as being unpatentable over Thaler and Whitney in view of U.S. Patent 5,874,134 to Rao et al. (Rao). As described below, Rao fails to make up for the deficiencies of Thaler and Whitney. Furthermore, Rao teaches away from the claimed method. Applicant respectfully request reconsideration of the rejection based on the following comments.

With respect to these claims, the Examiner cited Rao for teaching the use of a pump to maintain flow through the chamber and the use of thermal control of the stage holding the substrate. However, the deficiencies of the combined teachings of Thaler and Whitney with respect to independent claims 18 and 27 are described in detail above. Independent claim 71 has similar features as claims 18 and 27. As has been discussed in detail in previous responses, Rao teaches away from Applicant's claimed reaction configuration. In particular, Rao teaches that the laser beam or plasma torch must be aimed at the substrate such that it functions as a "hypersonic impactor." Thus, Rao does not make up for the deficiencies of Thaler and Whitney with respect to the orientation of the reactive flow and light beam. Specifically, none of the references alone or combined teach a reactant flow comprising metal or metalloid elements flowing **through** a light beam to form product particles **downstream** from the light beam that are directed to a substrate. Nothing in the combined teachings of these references points in any way to Applicant's claimed invention.

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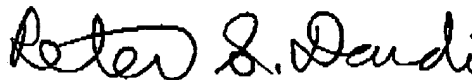
Thus, the combined teachings of the cited references do not render Applicant's claimed invention *prima facie* obvious. Applicants respectfully request withdrawal of the rejection of claims 21, 38, 63 and 65-70 under 35 U.S.C. § 102(b) as being obvious over Thaler and Whitney in view of Rao.

CONCLUSIONS

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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